**WHAT IS CLAIMED IS:**

1. A sapphire single crystal, comprising:

a single crystal sheet having a length, width and thickness, wherein length > width > thickness, the width is not less than about 15 cm, and the thickness is not less than about 0.5 cm.

2. The crystal of claim 1, wherein the width is not less than about 20 cm.

3. The crystal of claim 1, wherein the width is not less than about 25 cm.

4. The crystal of claim 1, wherein the thickness is not less than about 0.6 cm.

5. The crystal of claim 1, wherein the thickness is not less than about 0.7 cm (0.8, 0.9 in spec).

6. A sapphire single crystal, comprising:

a single crystal sheet having a length, wherein length > width > thickness, the width is not less than about 15 cm, and a variation in thickness of not greater than 0.2 cm.

7. The crystal of claim 6, wherein the variation in thickness is not greater than 0.15 cm.

8. The crystal of claim 6, wherein the variation in thickness is not greater than 0.10 cm.

9. The crystal of claim 6, wherein the variation in thickness is not greater than 0.07 cm.

10. The crystal of claim 6, wherein the variation in thickness is the difference between maximum and minimum thickness values along a segment spanning the width of the sheet.

11. A sapphire single crystal, comprising:

a single crystal sheet having a length, width and thickness, wherein length > width > thickness, the width is not less than about 15 cm, the thickness is not less than about 0.5 cm, and a variation in thickness of not greater than 0.2 cm.

12. A sapphire single crystal, comprising:

an as-grown single crystal sheet having a length, width and thickness, wherein length > width > thickness, the width is not less than about 15 cm, the single crystal sheet further having a neck and a main body that defines first and second opposite lateral sides that are generally parallel to each other, a transition of the neck to the main body portion is defined by respective first and second transition points of the first and second opposite lateral sides, and the single crystal has a $\Delta_T$ not greater than 4.0 cm, wherein $\Delta_T$ is the distance by which the respective first and second transition points are spaced apart as projected along a length segment of the single crystal sheet.

13. The crystal of claim 6, wherein $\Delta_T$ is not greater than about 3.0 cm.

14. The crystal of claim 6, wherein $\Delta_T$ is not greater than about 2.0 cm.

15. The crystal of claim 6, wherein the neck increases in thickness from its distal end to the main body.

16. A method of forming a single crystal, comprising:

providing a melt in a crucible having a die;

dynamically adjusting a thermal gradient along the die; and

drawing a single crystal from the die.

17. The method of claim 16, wherein the step of dynamically adjusting is carried out to reduce the thermal gradient along the die.

18. The method of claim 17, wherein the thermal gradient is reduced to a value of not greater than about 0.6 °C/cm along a length of the die during drawing.

19. The method of claim 18, wherein the step of dynamically adjusting is carried out prior to drawing, such that during drawing, the thermal gradient is reduced to said value.

20. The method of claim 16, wherein the step of dynamically adjusting is carried out during the drawing step.

21. The method of claim 16, wherein drawing a single crystal includes drawing a first single crystal and drawing a second single crystal, wherein the thermal gradient is adjusted after drawing the first single crystal and before drawing the second single crystal.

22. The method of claim 16, wherein the single crystal is sapphire.

23. The method of claim 16, wherein the die is linear and the single crystal is in the form of a generally planar sheet, the die having first and second opposite ends defining a length, the length of the die corresponding to the width of the generally planar sheet.

24. The method of claim 23, wherein the length of the die is not less than about 22 cm.

25. The method of claim 23, wherein the length of the die is not less than about 25 cm.

26. The method of claim 23, wherein the thermal gradient is adjusted by manipulating a movable thermal shield positioned along at least one of the first and second opposite ends of the die.

27. The method of claim 26, wherein a movable thermal shield is positioned at both the first and second opposite ends of the die.

28. The method of claim 26, wherein the movable shield functions to radiate heat toward the die.

29. The method of claim 23, wherein the thermal gradient is reduced to a value of not greater than about 20 °C between first and second opposite ends of the die during drawing.

30. The method of claim 29, wherein the thermal gradient is reduced to a value not greater than about 15 °C between first and second opposite ends of the die during drawing.

31. The method of claim 16, wherein the thermal gradient is adjusted by manipulating a heat sink, to draw heat away from the die.

32. The method of claim 31, wherein the heat sink is a heat exchanger.

33. The method of claim 32, wherein the heat exchanger has a fluid flowing therethrough.

34. The method of claim 33, wherein the heat sink is manipulated by modifying at least one of flow of the fluid and re-positioning the heat sink.

35. The method of claim 16, wherein the thermal gradient is adjusted by manipulating a movable thermal shield.

36. The method of claim 16, wherein the crucible is comprised of a refractory metal.

37. The method of claim 36, wherein the crucible comprises Mo.

38. The method of claim 16, wherein the melt is provided by heating using induction heating.

39. The method of claim 38, wherein induction heating is carried out by energizing an inductive coil surrounding the crucible.

40. The method of claim 16, wherein the coil forms a helix having multiple turns, the coil having a non-circular cross section having an aspect ratio of at least 2:1.

41. The method of claim 16, wherein the crucible has a non-circular horizontal cross section.

42. The method of claim 41, wherein the non-circular cross section is oval or rectangular.

43. The method of claim 41, wherein crucible has an aspect ratio not less than 2:1.

44. The method of claim 16, further comprising machining the single crystal into components.

45. A method of forming a single crystal, comprising:

providing a melt;

drawing a single crystal from the die; and

pulling the single crystal upward from the die and into an afterheater, the afterheater having a lower compartment and an upper compartment separated from each other by an isolation structure.

46. The method of claim 45, further comprising cooling the single crystal in the upper compartment of the afterheater, the single crystal cooling at a rate not greater than about 300 °C/hr.

47. The method of claim 46, wherein the rate is not greater than 200 °C/hr.

48. The method of claim 46, wherein the rate is not greater than 150 °C/hr.

49. The method of claim 46, wherein the rate is not greater than 100 °C/hr (50-100 in spec).

50. The method of claim 45, wherein the single crystal is a generally planar sheet having a mass greater than about 4 kg.

51. The method of claim 50, wherein the mass is greater than about 6 kg.

52. The method of claim 45, wherein isolation structure comprises isolation doors that close behind the crystal as the crystal passes into the upper compartment.

53. The method of claim 45, further comprising machining the single crystal into components.

54. A method of forming a single crystal, comprising:

providing a melt in a crucible of a melt fixture, the melt fixture having a die open to the crucible and a plurality of thermal shields overlying the crucible and the die, the thermal shields having configuration to provide a static temperature gradient along the die, such that temperature is at a maximum at about the midpoint of the die; and

drawing a single crystal from the die.

55. The method of claim 54, wherein thermal shields have a stepped configuration.

56. The method of claim 54, wherein thermal shields include a first shield set positioned along a first lateral side of the die, and a second shield set positioned along an opposite, second lateral side the die.

57. The method of claim 56, wherein each of the first and second shield sets are generally symmetrical about a vertical central axis corresponding to midpoint of the die.

58. A method of forming a single crystal, comprising:

providing a melt in a crucible of a melt fixture, the melt fixture comprising a linear die open to and extending along a length of the crucible, and a plurality of thermal shields overlying the crucible and the die, the thermal shields having a configuration to provide a static temperature gradient along the die, such that temperature is at a maximum at about the midpoint of the die, and the crucible having an aspect ratio of at least 2:1, the aspect ratio being defined as the ratio of the length of the crucible to the width of the crucible;

dynamically adjusting a thermal gradient along the die; and
drawing a single crystal from the die.

59. A melt fixture, comprising
a crucible;
a die open to and extending along a length of the crucible; and
and a plurality of thermal shields overlying the crucible and the die, the thermal shields having configuration to provide a static temperature gradient along the die, such that temperature is at a maximum at about the midpoint of the die.

60. The melt fixture of claim 59, wherein the thermal shields have a stepped configuration.

61. A melt fixture, comprising
a crucible;
a die open to and extending along a length of the crucible; and
an adjustable gradient trim device configured to adjust a temperature gradient along the length of the die.